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Scientific learning on the concept of colloid using literacy-based chemistry magazines

Scientific learning on the concept of colloid using literacy-based chemistry magazines

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Abstract. Chemistry is a science that is closely related to life. One of the many chemical concepts applied in life is the concept of colloid. Research focuses on scientific learning by using the concept of colloid chemistry magazine to develop students' chemical literacy. The method used is a classroom study with the design of one shot case study. The results obtained in student activities during learning are 96% on average, with very good categories. It is because scientific learning facilitate learners to participate actively during learning process will by using with chemical magazine. Thus, learning with scientific stages using chemical magazines can be used as an alternative learning to develop students' chemical literacy skills.

1. Introduction

Chemistry is the study of natural phenomena that occur in everyday life [1]. Natural phenomena that can be studied are found in one of the chemical concepts, namely the concept of colloid [2]. The concept of colloid is a concept that is closely related to everyday life [3], [4], because the concept of colloid learns about natural phenomena and their application in everyday life [5], [6] such as water purification, rainbow formation after rain, making gelatin and so on [7].

The ability to understand chemistry can be measured through chemical literacy [8]. The ability of chemistry literacy of students needs to be developed in the learning of the concept of colloid so that students can understand the environment, have scientific information and ways of scientific thinking in solving natural phenomena related to daily life [9]. Planting of scientific literacy curriculum is in line with the implementation of the 2013 implementation of learning to use a scientific approach 10].

Learning with a scientific approach is learning that is related to everyday life contextually [11]. Scientific learning is a learning that actively involves students and provides an opportunity to actively construct their own knowledge, so that students can understand the concept through the context of everyday life [12]. One effort that can be done to optimize chemistry learning is by choosing innovative learning and attracting students' interests, as well as making students learn actively that is learning using learning media [13].

Various studies on the application of chemical magazines as learning media have been widely carried out. One of them is the process of learning using media, which is more easily understood by students [14]. Innovative and creative learning media are generally able to increase students' learning interest through the presentation and delivery of interesting concepts [15]. One of the media that can be used in learning is the chemical magazine. One of the advantages of the chemical magazine is that it contains applicable information in accordance with developments and new findings, so that it can be used as a student learning supplement [16]. Chemical magazine as a learning media is expected to facilitate students to learn independently and get meaningfulness in chemistry subjects [17].

The update in this study is the learning process of metal purification using a scientific approach using a Literacy-based chemical magazine. Therefore, the purpose of this study is to describe the use of scientific learning by using chemical magazine on the concept of colloid to develop students' chemistry literacy.

2. Experimental Method

This study used a class research method with the design of one shot case study [18]. The subjects of this study were students of twelfth grade of Science, amounting to 40 students in the even semester of 2017/2018 school year at State Senior High School 1 of Rengasdengklok. The research stage began with the identification of problems, preparation, implementation and reporting. Student activity data was obtained through observation during the learning process by observers.

3. Result and Discussion

The concept of colloid could be more easily understood when in the learning process by using learning media namely chemical magazines. The following is the percentage of student activity with the scientific stages found in Figure 1.

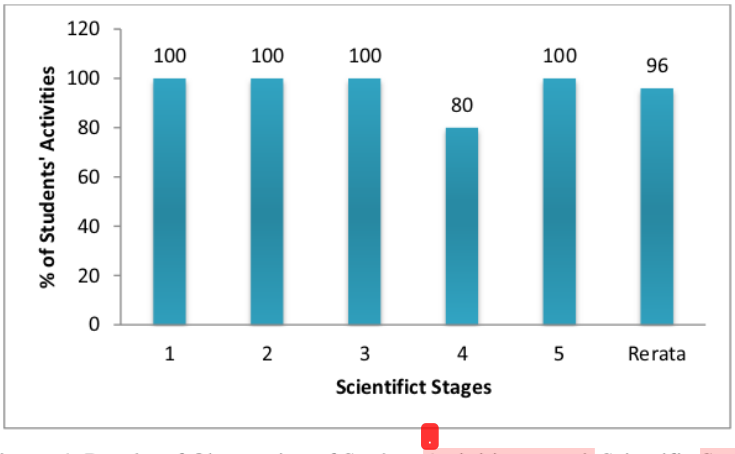

Figure 1. Results of Observation of Student Activities at each Scientific Stage

Figure 1 shows the results of observations of student activities from first stage to fifth stage. The stages of scientific learning were first stage: observing the discourse contained in chemical magazines; second stage: questioning on problems found in the chemical magazine; third stage: collecting data by designing experiments; fourth stage: associating by answering the questions contained in the Students' Worksheets; fifth stage: communicating the results of the experiments carried out.

a. Observing Stage

Based on observations of student activities carried out during learning, most students paid attention to, read and understand the discourse contained in chemical magazines. Percentage of observations of student activity at the observing stage is obtained at 100% with very good categories. Each group observed a different discourse on the chemical magazine. At the observation stage, students were enthusiastic in learning because the learning was supported by a chemical magazine. Visualization in chemical magazines made learning more enjoyable, so that it could attract students' attention [19]. Here was the look of the chemical magazine observed by each group:

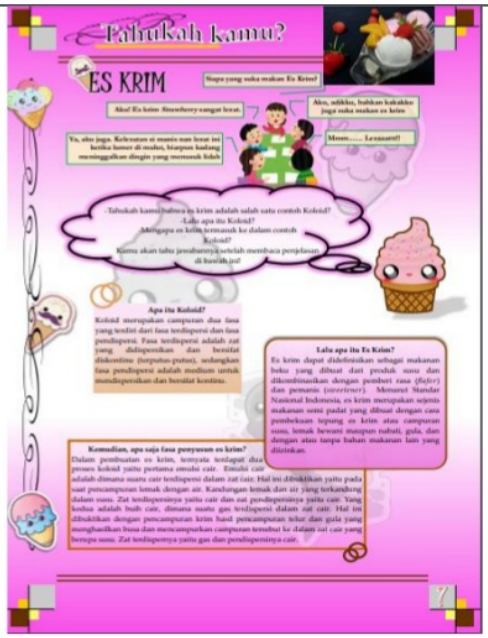

Figure 2. Introduction to Colloid Discourse

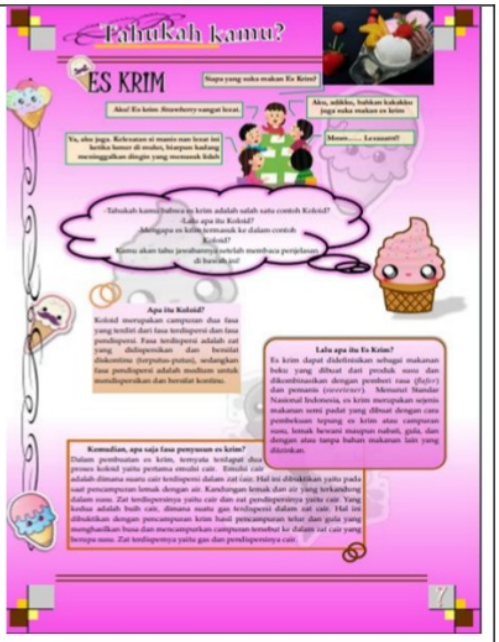

Figure 3. Ice cream ingredients and microscopic description

Based on the figure 2 above students were given chemical magazine which contains questions raised about the ice cream relating to colloids, a brief presentation about the notion of colloids, meaning ice cream and ice cream compiler phase. Figure 3 shows names of the raw material for making ice cream as well as its composition. It also contains image of milk and microscopic description, and explanation. In addition diagrams of milk content, exposure to types of ice cream making is given a microscopic description of the effects of Tyndall, Brownian motion and protective colloid, as well as the explanation.

Information on myths and facts commonly known in everyday life is provided, as well as images that support this information. It provides news of the flood that occurred on the National Road, Rancaekek Bandung, and exposure to the mixture of flood water one of which was mud which is a type of colloidal sol, and a brief discussion of the nature of coagulation can be seen in Figure 4. Water purification pictures and questions about the function of the filter layer are given. The question is given about the application of experiments given to cause students' chemical attitudes can be seen in Figure 5.

Based on picture 6 the chemical magazine contains a description of the type of colloid in the fog and the reason why the mist floated on. It also contains a story about fog and its pictures. Questions are asked about the nature of colloids in the fog. Figure 7 contains a trial of making jelly at home along with the picture. And the exposure that jelly is a type of solid-liquid colloid.

Figure 4. Flood News and Types of Colloids

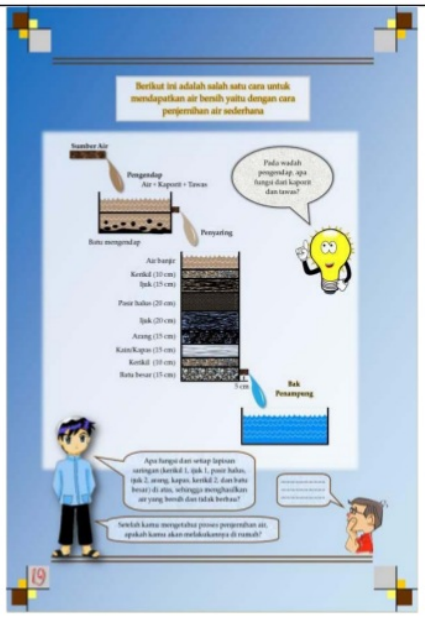

Figure 5. Water Purification Process

Figure 6. Discourse About Fog

Figure 7. Discourse about Agar

b. The Questioning Stage

Based on observations of student activities carried out during learning, most students discuss well in formulating questions. The percentage of student activity observation results at the stage of asking of 100% was obtained with very good category. At the questioning stage, students made various questions according to their thinking about the discourse and images that have been read and understood during the observation phase. One of the relevant questions was "why is jelly included in the type of colloid?" Questioning skills is a fundamental skill of students needs to have prior to further study a problem [20].

c. Stage of Collecting data

Students could design experimental procedures using chemical magazines in the learning process. Percentage of results of observation of student activities at the stage of collecting data was obtained at 100% with very good categories. At the stage of collecting data, students experiment at home. This was done because of the limitations of tools and materials and time allocation that were not possible. The learning was not only be done in the classroom or laboratory, but also field training, so that students could learn explore their knowledge directly.

d. Associating Stage

In groups, students work on the questions in Students Worksheet. Students connected the data that they have acquired during the experiment with the existing theory, by way of answering the questions contained in Student Worksheet. The percentage of observations of student activities at the stage of association was 80% with very good categories. At this stage of associating, students answered the questions contained in the Student Worksheet by discussing, because the discussion would increase the results. Discussion to solve problems made students to think more critically and collaborate in decision-making. All learning groups answered the question indicated by the students discussing very well. Lack of effective communication between group members could lead to incompatibility with what was learned [21].

e. Communication Stage

Students presented the results of the experiment and answers to the practice questions contained in the Student Worksheet. The percentage of observations of student activity at the communicating stage was obtained at 100% with very good categories. Students could explain based on facts obtained from the results of the experiments made with the group. Communication skill was an interesting skill generalization of a series of experimental activities or investigation results. Concluding skills could train students in drawing conclusions related to what students find or understand during learning [22].

Based on the results of observations it was known that student activities were carried out according to stages. The application process was carried out as usual learning, based on descriptions of learning that have been made and prepared. Students who took scientific learning by using chemical magazines to develop chemical literacy could study very well. The results of the implementation data analysis, at all stages of student activity has an average percentage of 96%, meaning that the learning process with the scientific stage used chemical magazines on the concept of colloid to develop chemical literacy skills carried out with a very good category. Scientific learning is learning that can improve student activities, such as developing the students 'activity, the concept and the mastery of chemistry students' literacy skills. This success gives a good impact on the activity of each learner in the group.

4. Concussion

Scientific learning on the colloid concept of using the chemical magazine can influenced student activities such as increasing student activity and mastery of concepts in developing chemical literacy.

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